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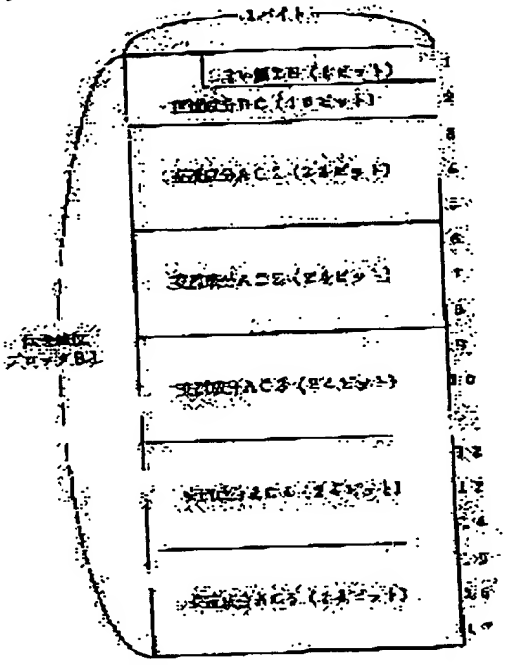
## (54) METHOD FOR TRANSMITTING ORTHOGONAL TRANSFORMATION CODING DATA

(57)Abstract:
PURPOSE: To reduce the effect of the occurrence of an error when the coefficient data generated in orthogonal transformation coding is transmitted.
CONSTITUTION: The coefficients data of 8×8 are generated by that the image blocks of 8×8 are DCT transformed. The DC components of the coefficient data are arranged on the first area of the head of a transmission unit block. The coefficient data AC1–AC5 whose importance is higher among the coefficient data of an AC component are arranged in a second area except the first area in the transmission unit block. That is, the second area is divided into five pieces of third areas, and the AC1–AC5 are arranged on the third areas respectively. The length of the third areas are set equal to the maximum length of a code generated in variable length coding.





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* NOTICES *



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3.In the drawings, any words are not translated.

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CLAIMS

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[Claim(s)]
[Claim 1] How to carry out variable length coding of the coefficient data which are characterized by providing the following and which were obtained [ make / the block which consists of two or more pixels / into a unit ] by carrying out orthogonal transformation, and to transmit them The 1st step which arranges the coefficient data of the dc component of the above-mentioned coefficient data to the 1st field to which it was set within the transmission unit block The step which arranges the coefficient data of two or more alternating current components with a more high significance to the 3rd field which was able to be prepared independently in the field of the above 2nd while arranging coefficient data with a comparatively high significance to the 2nd field of the above-mentioned transmission unit block among the coefficient data of the alternating current component of the above-mentioned coefficient data The 3rd step which arranges the remaining coefficient data of the coefficient data of the above-mentioned alternating current component to the free area within the above-mentioned transmission unit block
[Claim 2] The data transmission method which is the data transmission method according to claim 1, and is characterized by setting up the length of the 3rd field of the above equally to the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 3] The data transmission method which is the data transmission method according to claim 1, and is characterized by being set as what has the length of the 3rd field of the above a little shorter than the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 4] The data transmission method that it is the data transmission method according to claim 1, and the length of the 3rd field of the above is characterized for what has a high significance by being set as a long thing.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the transmission method of the orthogonal transformation coded data produced by orthogonal transformation coding and variable length coding.
[0002]
[Description of the Prior Art] When compressing the amount of data transmission of digital image data, the coding method of using orthogonal transformation, such as two-dimensional cosine conversion (it being called below Discrete Cosine Transform : DCT), is proposed from the former.

[0003] The coding method by DCT divides the television signal of one frame into two or more small blocks which consist of m pixels of a horizontal n pixel x perpendicular direction, gives DCT to each block, changes the coefficient data of the dc component obtained as a result, and the coefficient data of two or more alternating current components into the entropy sign from which bit length differs according to the appearance probability of each alternating current component, for example, a Huffman code, and transmits it.
[0004]
[Problem(s) to be Solved by the Invention] By the way, although it is possible to record the image data compressed as mentioned above on a digital video tape recorder, it is desirable that the best possible reproduction picture is acquired in high-speed search operation in this digital video tape recorder.
[0005] At the time of this high-speed search, since a rotary head scans ranging over two or more recording tracks, it cannot be [ reproduction data ] intermittent. However, the Huffman code which entropy signs, such as a Huffman code, are variable length, and bit length moreover generates is recorded continuously. Therefore, at the time of the high-speed search from which intermittent reproduction data are not obtained, a decryption of a Huffman code becomes difficult.
[0006] Moreover, since bit length is recording the adjustable Huffman code continuously, when a bit error occurs in one code, depending on the code which the influence spread also in the code after it, code discernment becomes impossible, and the error generated, propagation of an error may not remain in an applicable block, but may reach to other blocks.
[0007] Although a means to record on the position which was able to define the dc component by the fixed length as a means to solve the above trouble is already common, the thing of carrying out fixed-length record is in the position where only the number which was able to define beforehand the coefficient data of the high alternating current component of significance was set to what is advocated as a method of handling of an alternating current component.
[0008] However, since there was a fault in which coding efficiency deteriorates in order to fixed-length-ize data to this technique, and actual so many alternating current components were not able to be recorded, there was a fault from which so good a picture is not acquired also at the time of error generating also at the time of a high-speed search.
[0009] Moreover, what carries out variable length record is indicated by JP,4-322591,A concerning an applicant's for this patent proposal in the position where only the number which

was able to define beforehand the coefficient data of the high alternating current component of significance was defined.
[0010] Although there was an advantage that generating amount of information did not increase at all, as for this technique, since many alternating current components were unrecordable, there was a trouble that so good a picture was not acquired, like the above-mentioned technique also at the time of error generating also at the time of a high-speed search.
[0011] Furthermore, the technique of carrying out arrangement record is also possible in the position where only the amount which was able to define the coefficient data of an alternating current component sequentially from the one where significance is higher was defined. Since generating amount of information does not increase at all but this technique can record many alternating current components, a very good picture is acquired also at the time of error generating also at the time of a high-speed search.
[0012] However, when an error occurs in the high alternating current component data of significance, since [ that logging of all the alternating current component data after it is impossible ] it becomes, concealed one of the block is very difficult and there is a trouble that it is difficult to acquire a good restoration picture.
[0013] The purpose of this invention is to offer the transmission method of the orthogonal transformation coded data which solved the above trouble.
[0014]
[Means for Solving the Problem] It is the method of carrying out variable length coding of the coefficient data which this invention made the unit the block which consists of two or more pixels, and were obtained by carrying out orthogonal transformation, and transmitting them. The 1st step which arranges the coefficient data of the dc component of the coefficient data to the 1st field to which it was set within the transmission unit block, While arranging coefficient data with a comparatively high significance to the 2nd field of a transmission unit block among the coefficient data of the alternating current component of the coefficient data The step which arranges the coefficient data of two or more alternating current components with a more high significance to the 3rd field which was able to be prepared independently in the 2nd field, It is the transmission method of the orthogonal transformation coded data characterized by the bird clapper from the 3rd step which arranges the remaining coefficient data of the coefficient data of an alternating current component to the free area within a transmission unit block.
[0015]
[Function] For every predetermined transmission unit, sequentially from the one where significance is higher, only the defined amount (not being the number) is arranged and transmitted to the defined position (for example, record), and, moreover, the coefficient data of the dc component of the coefficient data and an alternating current component are arranged about the coefficient data of some alternating current components with a high significance in the respectively independent position. As a result, at for example, the time of the high-speed search of a digital video tape recorder, these coefficient data can be extracted, and it can decrypt. Moreover, since it is arranged in the defined position, these coefficient data can be decrypted, without being influenced of an error. And these coefficient data are the important components in the image data of a block unit, if these can be decoded, a good restoration picture will be acquired and its quality of image of a restoration picture when the time of a high-speed search and an error arise will improve.
[0016] Since it is especially recorded on the independent field about the coefficient data of some alternating current components with a high significance, data can be independently cut down not related to the error of front data. Therefore, since many data can be cut down conventionally, concealed ones becomes easy and the quality of image of a restoration picture improves.
[0017]
[Example] Hereafter, the example at the time of applying the transmission method of the bandwidth compression data based on this invention to the recording system of a digital video tape recorder is explained, referring to drawing.
[0018] Drawing 1 shows one example of the recording system of a digital video tape recorder. That is, the picture signal of raster scan form of having been inputted through the input terminal 11 is supplied to A/D converter 12, and is changed into the digital image signal whose 1-pixel

sample is 8 bits. This digital image signal is supplied to the blocking circuit 13.
[0019] This blocking circuit 13 considers the field which has the memory of the capacity which can record the digital image signal for one frame, for example, consists of x (horizontal 8 pixels) (8 pixels of a perpendicular direction (line)) as 1 picture block, and the digital image signal of one frame (one screen) is divided into two or more picture blocks. In this case, a 64-pixel sample is contained in 1 picture block.
[0020] Moreover, in this blocking circuit 13, while the blanking period when the data in an input picture signal do not exist is removed, an effective data shall continue and a data lack period is formed into a data sequence.
[0021] The data of each picture block from the blocking circuit 13 are supplied to the shuffling circuit 14. In the shuffling circuit 14, the processing into which all picture blocks in one frame are rearranged in the unit of a picture block according to a predetermined rule in one frame is made. This shuffling processing is performed by address control of memory.
[0022] The output signal of the shuffling circuit 14 is supplied to the DCT conversion circuit 21 of the coding section 20. In this DCT conversion circuit 21, DCT transform processing is made for every picture block, and the coefficient data of 8x8 corresponding to two or more block sizes are obtained from this DCT conversion circuit 21. Coefficient data consist of coefficient data DC of a dc component, and coefficient data ACi (i=1-63) of two or more alternating current components, as shown in drawing 2 A.
[0023] The coefficient data from the DCT conversion circuit 21 are supplied to the block scanning circuit 22, and from this block scanning circuit 22, the coefficient data for every block are outputted in the state of carrying out a zigzag scan toward the direction where an alternating current component is high in frequency from a dc component DC, as shown in drawing 2 B. In drawing 2 B, the numeric value indicated to be 0, 1, 2, and ... shows the turn outputted. Generally, in a DCT coefficient, the low-frequency component is more visually [ than a high frequency component ] more important, and an alternating current component coefficient is rearranged into order with a high significance in this block scanning circuit 22.
[0024] The coefficient data from the block scanning circuit 22 are supplied to the re-quantization circuit 23. In this re-quantization circuit 23, coefficient data are quantized by the quantization-step width of face from the buffer control circuit 27.
[0025] The output signal of the re-quantization circuit 23 is supplied to the variable-length-coding circuit 25. This variable-length-coding circuit 25 encodes the alternating component of coefficient data with a variable length sign like Huffman coding. The output data of the variable-length-coding circuit 25 are supplied to buffer memory 26. Buffer memory 26 is formed in order to carry out rate conversion so that the transmission rate of a tape-recording reproduction conversion system may not be exceeded if it is the case where coefficient data are a predetermined transmission rate, i.e., the digital video tape recorder of this example. That is, although the data rate of the input side of this buffer memory 26 is adjustable, it becomes almost fixed [ the data rate of an output side ].
[0026] Moreover, in this buffer memory 26, change of the transmission amount of data is detected and a detection output is supplied to the buffer control circuit 27. The buffer control circuit 27 controls the quantization-step width of face of the re-quantization circuit 23, and it controls it so that the data which are outputted in the variable-length-coding circuit 25 and which are transmitted serve as the predetermined amount of data. For example, when there is too much transmission amount of data, quantization-step width of face is enlarged and the transmission amount of data decreases. In addition, you may be made to perform buffering processing of the feedforward form which controls the quantization-step width of face of not only feedback control like this example but the re-quantization circuit 23, and controls the amount of transaction datas of a predetermined period.
[0027] The output signal from buffer memory 26 is supplied to the frame-ized circuit 28, a sink block is constituted for every predetermined amount of data, and coefficient data are rearranged into the data array of the frame structure with which this sink block continues. This invention has the feature in the processing made in this frame-ized circuit 28.
[0028] Drawing 3 shows an example of the composition of the sink block SB. The sink block SB is formed from two or more transmission unit blocks BL. In this example, this transmission unit

block BL consists of 17 bytes (=136 bit), as shown in drawing 4 , and it is arranged in the threshold TH showing quantization-step width of face and the position where this transmission unit block BL was defined for the coefficient data DC of a dc component, and the coefficient data AC of an alternating current component, i.e., the 1st field.

[0029] In the example of drawing 4 , 10 bits is assigned to the coefficient data DC of 6 bits and a dc component at a threshold TH. Moreover, 15 bytes (=120 byte) are assigned as the 2nd field for the coefficient data AC of an alternating current component. Furthermore, the 2nd field for alternating current components is divided into the 3rd field of length equal to the longest thing in the Huffman code used. In the example of drawing 4 , as a maximum of 24 bits (=3 byte), 5 ****s of the 2nd field for alternating current components are carried out every 3 bytes, and let the Huffman code used be the 3rd field the alternating current component AC 1 - for AC5.

[0030] Hereafter, drawing 5 - drawing 7 are used and the data transmission method by which it is characterized [ of this invention ], i.e., the processing made in the frame-ized circuit 28, is explained. 2 transmission unit block is included in 1 sink block, and the following examples are this example in which buffering is performed per 1 sink block.

[0031] The threshold and dc-component data which are a fixed length data are arranged in the 2 bytes of 1st field where each transmission unit block BL was defined, for example, top section. Other fields of the transmission unit block BL are the 2nd field for the coefficient data of an alternating current component.

[0032] About the high alternating current component data (AC1-AC5) of significance, it is arranged comparatively at each of the 3rd field currently prepared beforehand. [ in this case ] Since each field is prepared by the longest Huffman code used as mentioned above, each coefficient data of AC1-AC5 can be arranged in the surely prepared field. This situation is shown in drawing 5 . However, you may make the length of each field a little shorter than this maximum length. Furthermore, mutually, the need for equal length does not have the 3rd field, and according to significance, you may change it so that the field to AC1 may be made longer than the length of the field to AC5.

[0033] It is inserted [ it is carried out by point-stuffing the field which has **ed within the transmission unit block BL one by one, and ] and arranged after the high alternating current component data of significance are recorded about the low alternating current component data (it is AC6- in this case) of significance. This situation is shown in drawing 6 .

[0034] Since buffering is not performed per each transmission unit block, the transmission unit block which can arrange no alternating current component data may occur. In the train of drawing 6 , capacity runs short in the transmission unit block 2, and the part and EOB of AC24 cannot be arranged.

[0035] It is inserted [ it is carried out by the above procedure point-stuffing to the field in which the data which have not been arranged were seen per buffering (equal to a sink block in this example), and it is left one by one, and ] and arranged. This situation is shown in drawing 7 . The part and EOB of AC24 of the transmission unit block 2 which have not arranged the point are arranged at the free area of the transmission unit block 1. The flow chart of data arrangement processing is shown in drawing 8 .

[0036] As shown in drawing 8 , at the 1st step, a threshold and the coefficient data of a dc component are arranged to the 1st field to which it was set within the transmission unit block. At the 2nd following step, AC1-AC5 are arranged to the 3rd field to which the 2nd field for alternating current components was appointed in data with a comparatively high significance in the coefficient data of an alternating component, and an above-mentioned example. At the 3rd step, the coefficient data of the remaining alternating current components are stuffed to the free area within a transmission unit block.

[0037] Between the 2nd step and the 3rd step, the step of a judgment of whether to have ended arrangement of all data exists. After the 3rd step finishes, when there are still data which were not able to be stuffed into the transmission unit block, the coefficient data of a non-arranged alternating current component are stuffed into the free area produced in the whole sink block. Thus, processing of frame-izing is completed.

[0038] If it returns and explains to drawing 1 , the output signal of the frame-ized circuit 28 will be supplied to the parity generating circuit 15, for example, coding of the sign for error

corrections of product-code composition will be made, and generation addition of the parity data will be carried out. The compression image data to which this parity data was added is supplied to the digital modulation circuit 16, and digital modulation is made. And the output signal of the digital modulation circuit 16 is supplied to the parallel 1 in-series conversion circuit 17, and is made into the record signal of serial data. Magnetic recording of the in-series record signal from the parallel 1 in-series conversion circuit 17 is carried out to a tape by the rotary head as four slanting trucks per data of one frame.

[0039] In addition, although not illustrated, the block recognition signal ID (for example, 2 bytes) and the block synchronizing signal SYNC (for example, 2 bytes) are added between the parity generating circuit 15 and the digital modulation circuit 16. The position of the coefficient data DC of threshold TH arranged by this block recognition signal ID to the predetermined field of the sink block SB and a dc component and the coefficient data AC of an alternating current component is known.

[0040] As mentioned above, since the dc component of the coefficient data and the alternating current component are recorded on the field set to important order and are recorded on the independent field about the high alternating current component of especially significance Even if it cannot be [ reproduction data ] intermittent at the time of a high-speed search, the coefficient data of these dc components and an important alternating current component can be extracted, and a good restoration picture can be acquired by decrypting these coefficient data.

[0041] Moreover, when the error which cannot be corrected occurred at the time of normal reproduction, conventionally, a certain bit error might spread to other blocks, and the reproduction picture might deteriorate very much. For example, it is the case where an error occurs in the block termination code EOB. On the other hand, in this invention, the error generated in a certain block does not participate in logging of the coefficient data of the dc component of other blocks and an important alternating current component at all. Therefore, it becomes strong to an error to the above-mentioned former, and the reproduction picture by which quality of image has been improved can be acquired.

[0042] Furthermore, when an error arises for the high alternating current component coefficient of significance by the technique by the conventional variable length record, the data after it cannot be cut down. For example, when an error arose in AC1, data logging was not able to do AC2, AC3, AC4, AC5, and ... On the other hand, in this invention, even when AC1 has an error, the coefficient currently recorded on the independent field can be started, without being influenced of error propagation (AC2-AC5 can be started in this example of explanation). Therefore, a reproduction picture good as a result can be acquired that it is very easy to carry out concealed one rather than it is based on the conventional technique.

[0043] It is just going to say that the point of this invention is recorded on an independent field about the coefficient data of some alternating current components with the further highest significance recorded as much as possible on the field which was able to define the coefficient data of an alternating current component in capacity.

[0044] Only the number which was able to define beforehand the already proposed coefficient data of the high alternating current component of significance In the defined position, the method of carrying out fixed-length record, and the coefficient data of the high alternating current component of significance which invention-in-this-application persons proposed before again The method of carrying out variable length record, in the position where only the number defined beforehand was defined Since the number of the coefficient data of the alternating current component to record was restricted to the number which is not, so good a restoration picture cannot be acquired only by the decode by the data of only these fixed record sections.

[0045] Moreover, although the method which invention-in-this-application persons proposed recently of recording on the field which was able to define the coefficient data of an alternating current component as much as possible in capacity has solved many of above-mentioned troubles When an error occurred to the high alternating current component data of significance, logging of the alternating current component data after it of the same block became impossible, and the trouble that it was difficult to acquire a good restoration picture about the block remained.

[0046] On the other hand, according to the technique of this invention, the coefficient data of

the alternating current component of an applicable block are recorded on the coefficient data AC of an alternating current component. since all the data of the block are recorded on a fixed-area portion when the amount of the coefficient data of the alternating current component of a certain block is smaller than the field of the coefficient data AC of an alternating current component — the time of a high-speed search — the time of an error — both — an original restoration picture — a picture as it is can be acquired Moreover, when the amount of the coefficient data of the alternating current component of a certain block is larger than the field of the coefficient data AC of an alternating current component, although some data of the block will be recorded on a fixed record section, since the coefficient data of many alternating current components will generally be recorded on a fixed record section rather than the above-mentioned proposal technique also by this case, a restoration picture better than the conventional technique can be acquired.

[0047] Moreover, although amount of information increases by generally taking this format by the method of carrying out fixed-length record, in the position where only the number which was able to define beforehand the coefficient data of the high alternating current component of the above-mentioned significance was defined, increase of all amount of information is not generated by the method of this invention.

[0048] Furthermore, a good restoration picture is acquired rather than before also about the block which extraction of data could perform, without being influenced by the error generated to other data of propagation since it is recorded on the independent field about coefficient data with the highest significance, therefore the error generated to coefficient data with the highest significance.

[0049] In addition, although explanation followed DCT, this invention is not restricted to DCT and is applicable about general orthogonal transformation coding.

[0050] Moreover, although explanation was performed only by the case where 1-dimensional Huffman is used since it was easy, when two-dimensional Huffman is used, it can completely apply similarly.

[0051] In addition, this invention can be applied not only when applied to a digital video tape recorder but when using various transmission lines.

[0052]

[Effect of the Invention] As mentioned above, even if it cannot be [ reproduction data ] intermittent at the time of a high-speed search according to this invention when this invention is applied, for example to a digital video tape recorder, since important information was arranged and transmitted to the defined position as explained, these important data can be extracted, and a good reproduction picture can be acquired by decrypting these coefficient data.

[0053] Moreover, although the error generated in a certain block might have fatal influence even on other blocks when the error which cannot be corrected occurred at the time of normal reproduction In this invention, since many information is recorded on the appointed field, even if it can extract coefficient data important also in such a case and they have an error, they can acquire the reproduction picture which improved, and its error-proof nature improves.

[0054] Furthermore, a good restoration picture is acquired rather than before also about the block which extraction of data could perform, without being influenced by the error generated to other data of propagation since it is recorded on the independent field about coefficient data with the highest significance, therefore the error generated to coefficient data with the highest significance.

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[Translation done.]

* NOTICES *



## DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the block diagram showing the example of composition of the digital video tape recorder for enforcing the transmission method by this invention.
[Drawing 2] It is an abbreviation diagram for explaining the coefficient data of a DCT conversion output.
[Drawing 3] It is the abbreviation diagram showing the example of composition of the sink block to record.
[Drawing 4] It is the abbreviation diagram showing a part of data array of the important section of transmission data.
[Drawing 5] It is drawing for explaining an example of frame-ized operation of this invention.
[Drawing 6] It is drawing for explaining an example of frame-ized operation of this invention.
[Drawing 7] It is drawing for explaining an example of frame-ized operation of this invention.
[Drawing 8] It is a flow chart for explaining frame-ized operation of this invention.
[Description of Notations]
21 DCT Conversion Circuit
23 Re-Quantization Circuit
25 Variable-Length-Coding Circuit
28 Frame-ized Circuit

[Translation done.]

* NOTICES *



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CORRECTION or AMENDMENT

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[Filing Date] March 10, Heisei 12 (2000. 3.10)
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[Document to be Amended] Specification
[Item(s) to be Amended] The name of invention
[Method of Amendment] Change
[Proposed Amendment]
[Title of the Invention] The coding method and coding equipment
[Procedure amendment 2]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Change
[Proposed Amendment]
[Claim(s)]
[Claim 1] In the coding method which encodes a digital signal
The step which gives block conversion coding including the processing which it faces performing decode processing and is divided into the 3rd data with a small significance as compared with the 2nd small data and the 2nd data of the above of significance as compared with the 1st large data and the 1st data of the above of significance,
The step which gives variable length coding to the 2nd data of the above, and the 3rd data of the above,
It has the output step which outputs the 1st data of the above and the 2nd data of the above by which variable length coding was carried out, or the 3rd data of the above by which variable length coding was carried out for every data unit containing the data of the amount of fixation.

The above-mentioned data unit consists of the 1st field and two or more 2nd fields,
The above-mentioned output step,
The step which arranges the 1st data of the above to the 1st field of the above,
The step which arranges each of two or more 2nd data of the above by which variable length coding was carried out to each of two or more 2nd fields of the above,
The coding method characterized by including the step which arranges each of two or more 3rd data of the above by which variable length coding was carried out to the field to which the 2nd data of the above is not arranged among the 2nd field of the above.
[Claim 2] In a claim 1
The coding method characterized by being arranged in the above-mentioned data units other than the above-mentioned data unit by which the 1st data of the above has been arranged when the 3rd data of the above by which variable length coding was carried out is not arranged in the above-mentioned data unit by which the 1st data of the above within the same block as the 3rd data concerned has been arranged.
[Claim 3] In a claim 1
Two or more above-mentioned data are the coding methods characterized by being coefficient data obtained by carrying out orthogonal transformation of two or more pixels.
[Claim 4] In a claim 1
The 1st data of the above is the coding method characterized by being a fixed length data including the dc component and quantization information in the coefficient data obtained by carrying out orthogonal transformation of two or more pixels.
[Claim 5] In a claim 1
The 2nd data of the above is the coding method which faces decoding a digital signal among the alternating current components in the coefficient data obtained by carrying out orthogonal transformation of two or more pixels, and is characterized by being the large alternating current component of significance.
[Claim 6] In a claim 1
The coding method characterized by setting up the length of the 2nd field of the above equally to the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 7] In a claim 1
The coding method characterized by being set as what has the length of the 2nd field of the above a little shorter than the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 8] In a claim 1
The coding method that the length of the 2nd field of the above is characterized for what has a high significance by being set as a long thing.
[Claim 9] In the coding equipment which encodes a digital signal
A means to give block conversion coding including the processing which it faces performing decode processing and is divided into the 3rd data with a small significance as compared with the 2nd small data and the 2nd data of the above of significance as compared with the 1st large data and the 1st data of the above of significance,
A means to give variable length coding to the 2nd data of the above, and the 3rd data of the above,
It has an output means to output the 1st data of the above and the 2nd data of the above by which variable length coding was carried out, or the 3rd data of the above by which variable length coding was carried out for every data unit containing the data of the amount of fixation.
The above-mentioned data unit consists of the 1st field and two or more 2nd fields.
The above-mentioned output means The coding equipment characterized by to perform the processing which arranges the 1st data of the above to the 1st field of the above, arranges each of two or more 2nd data of the above by which variable length coding was carried out to each of two or more 2nd fields of the above, and arranges each of two or more 3rd data of the above by which variable length coding was carried out to the field to which the 2nd data of the above is not arranged among the 2nd field of the above.
[Claim 10] In a claim 9
Coding equipment characterized by being arranged in the above-mentioned data units other than

the above-mentioned data unit by which the 1st data of the above has been arranged when the 3rd data of the above by which variable length coding was carried out is not arranged in the above-mentioned data unit by which the 1st data of the above within the same block as the 3rd data concerned has been arranged.
[Claim 11] In a claim 9
Two or more above-mentioned data are coding equipment characterized by being coefficient data obtained by carrying out orthogonal transformation of two or more pixels.
[Claim 12] In a claim 9
The 1st data of the above is coding equipment characterized by being a fixed length data including the dc component and quantization information in the coefficient data obtained by carrying out orthogonal transformation of two or more pixels.
[Claim 13] In a claim 9
The 2nd data of the above is coding equipment which faces decoding a digital signal among the alternating current components in the coefficient data obtained by carrying out orthogonal transformation of two or more pixels, and is characterized by being the large alternating current component of significance.
[Claim 14] In a claim 9
Coding equipment characterized by setting up the length of the 2nd field of the above equally to the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 15] In a claim 9
Coding equipment characterized by being set as what has the length of the 2nd field of the above a little shorter than the maximum length of the code generated in the above-mentioned variable length coding.
[Claim 16] In a claim 9
Coding equipment with which the length of the 2nd field of the above is characterized for what has a high significance by being set as a long thing.
[Procedure amendment 3]
[Document to be Amended] Specification
[Item(s) to be Amended] 0001
[Method of Amendment] Change
[Proposed Amendment]
[0001]
[Industrial Application] This invention relates to the coding method and coding equipment which perform coding containing orthogonal transformation coding and variable length coding.
[Procedure amendment 4]
[Document to be Amended] Specification
[Item(s) to be Amended] 0013
[Method of Amendment] Change
[Proposed Amendment]
[0013] The purpose of this invention is to offer the coding method and coding equipment which solved the above trouble.
[Procedure amendment 5]
[Document to be Amended] Specification
[Item(s) to be Amended] 0014
[Method of Amendment] Change
[Proposed Amendment]
[0014]
[Means for Solving the Problem] It faces that this invention performs decode processing in the coding method which encodes a digital signal. The 1st data with a large significance, The step which gives block conversion coding including the processing divided into the 3rd data with a small significance as compared with the 2nd data with a small significance, and the 2nd data as compared with the 1st data, The step which gives variable length coding to the 2nd data and the 3rd data, It has the output step which outputs the 1st data and 2nd data by which variable length coding was carried out, or 3rd data by which variable length coding was carried out for every data unit containing the data of the amount of fixation. a data unit The 1st field, It consists of

two or more 2nd fields. an output step The step which arranges the 1st data to the 1st field, and the step which arranges each of two or more 2nd data by which variable length coding was carried out to each of two or more 2nd fields, It is the coding method characterized by including the step which arranges each of two or more 3rd data by which variable length coding was carried out to the field to which the 2nd data is not arranged among the 2nd field. Moreover, this invention is set to the coding equipment which encodes a digital signal. It faces performing decode processing and compares with the 1st data with a large significance, and the 1st data. The 2nd data with a small significance, A means to give block conversion coding including the processing divided into the 3rd data with a small significance as compared with the 2nd data, A means to give variable length coding to the 2nd data and the 3rd data, It has an output means to output the 1st data and 2nd data by which variable length coding was carried out, or 3rd data by which variable length coding was carried out for every data unit containing the data of the amount of fixation. a data unit It consists of the 1st field and two or more 2nd fields, and is an output means. The 1st data is arranged to the 1st field. It is coding equipment characterized by performing processing which arranges each of two or more 2nd data by which variable length coding was carried out to each of two or more 2nd fields, and arranges each of two or more 3rd data by which variable length coding was carried out to the field to which the 2nd data is not arranged among the 2nd field.

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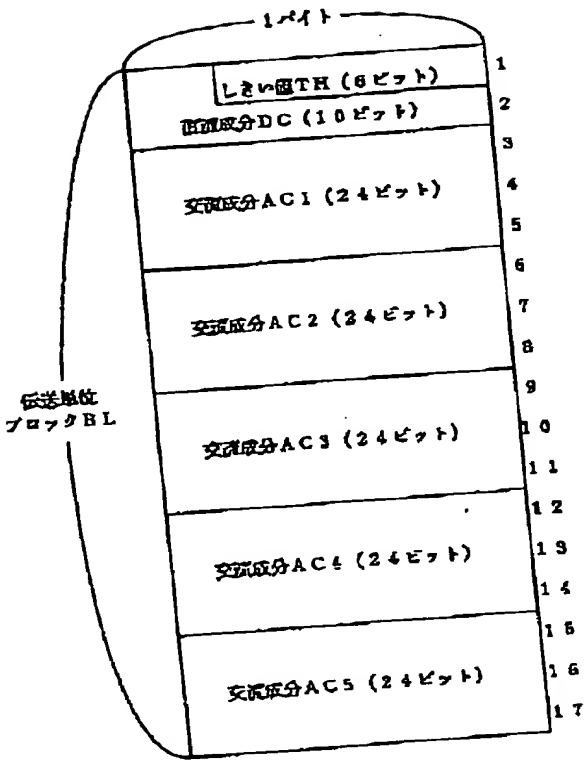
[Translation done.]


1バイト
しきい値TH（6ビット）
直流成分DC（10ビット）
交流成分AC1（24ビット）
交流成分AC2（24ビット）
交流成分AC3（24ビット）
交流成分AC4（24ビット）
交流成分AC5（24ビット）
伝送単位
ブロックBL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

[Drawing 1]

* NOTICES *

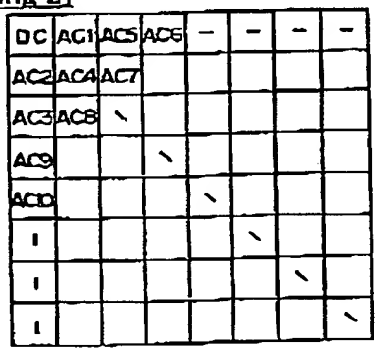


1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

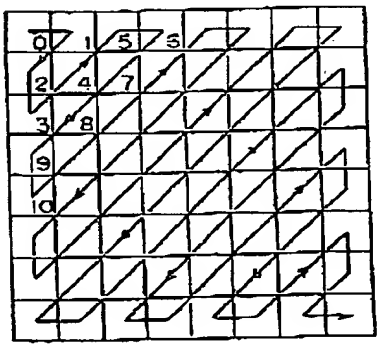
## DRAWINGS

[Drawing 2]

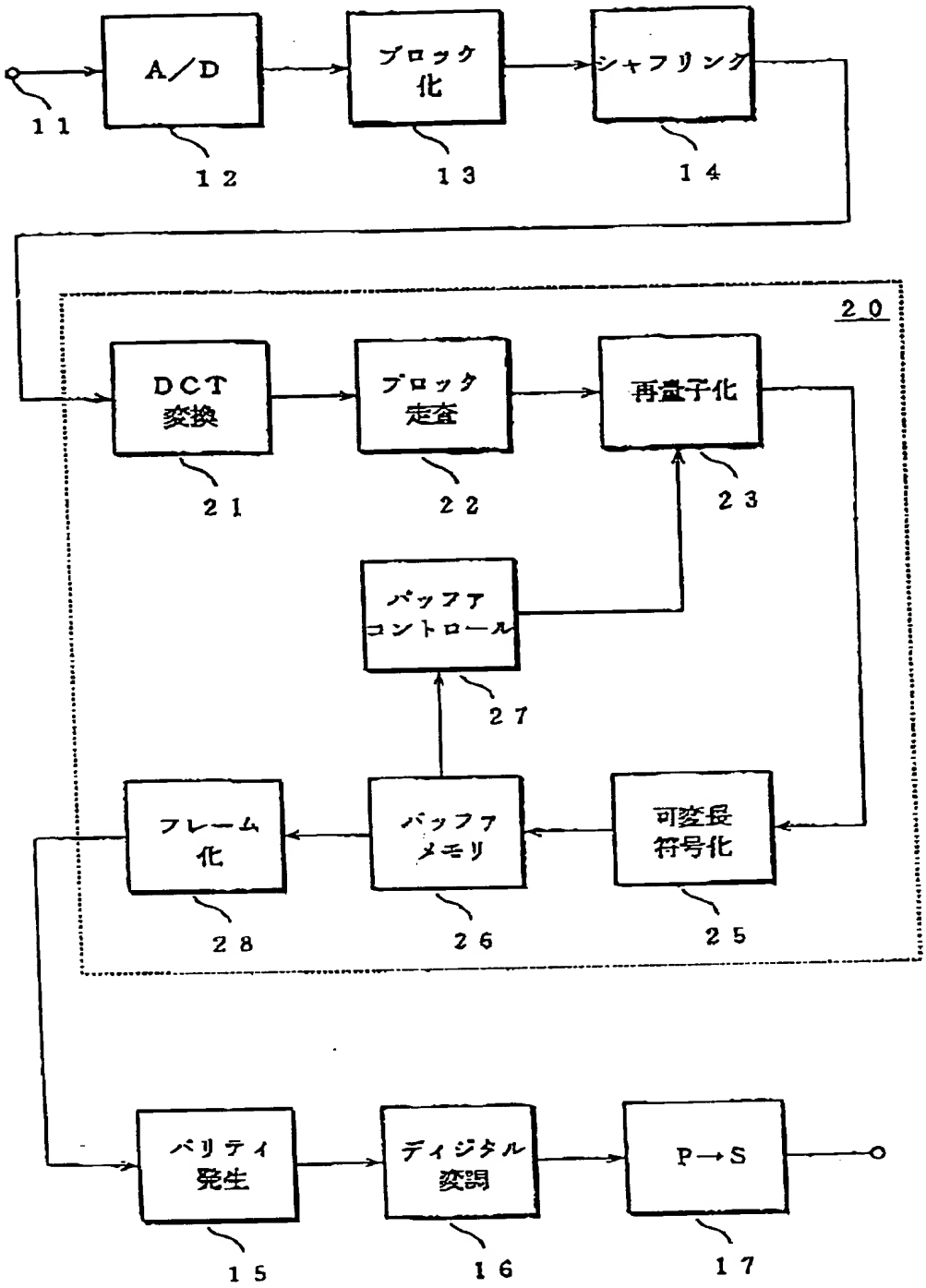
A



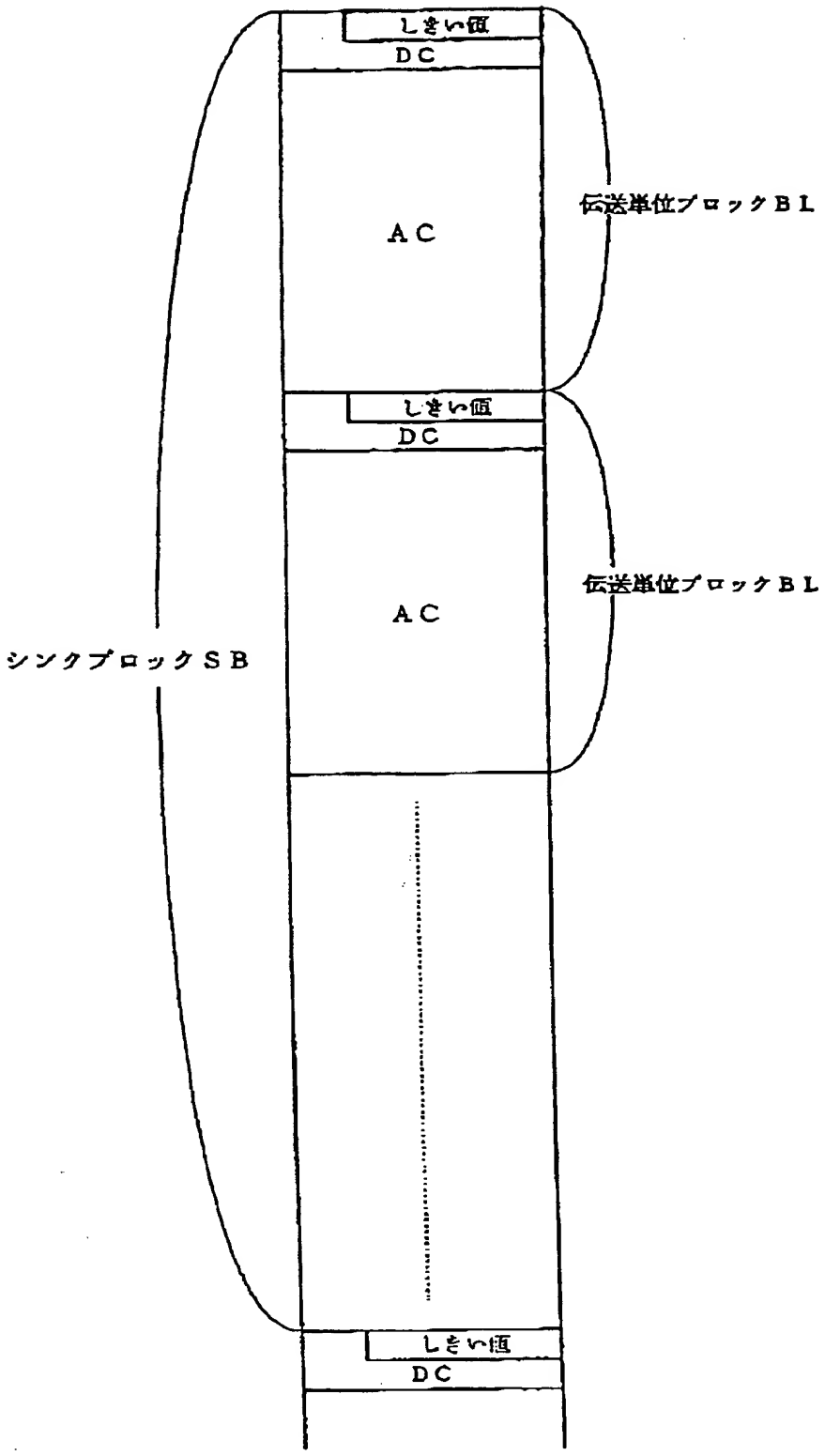

B



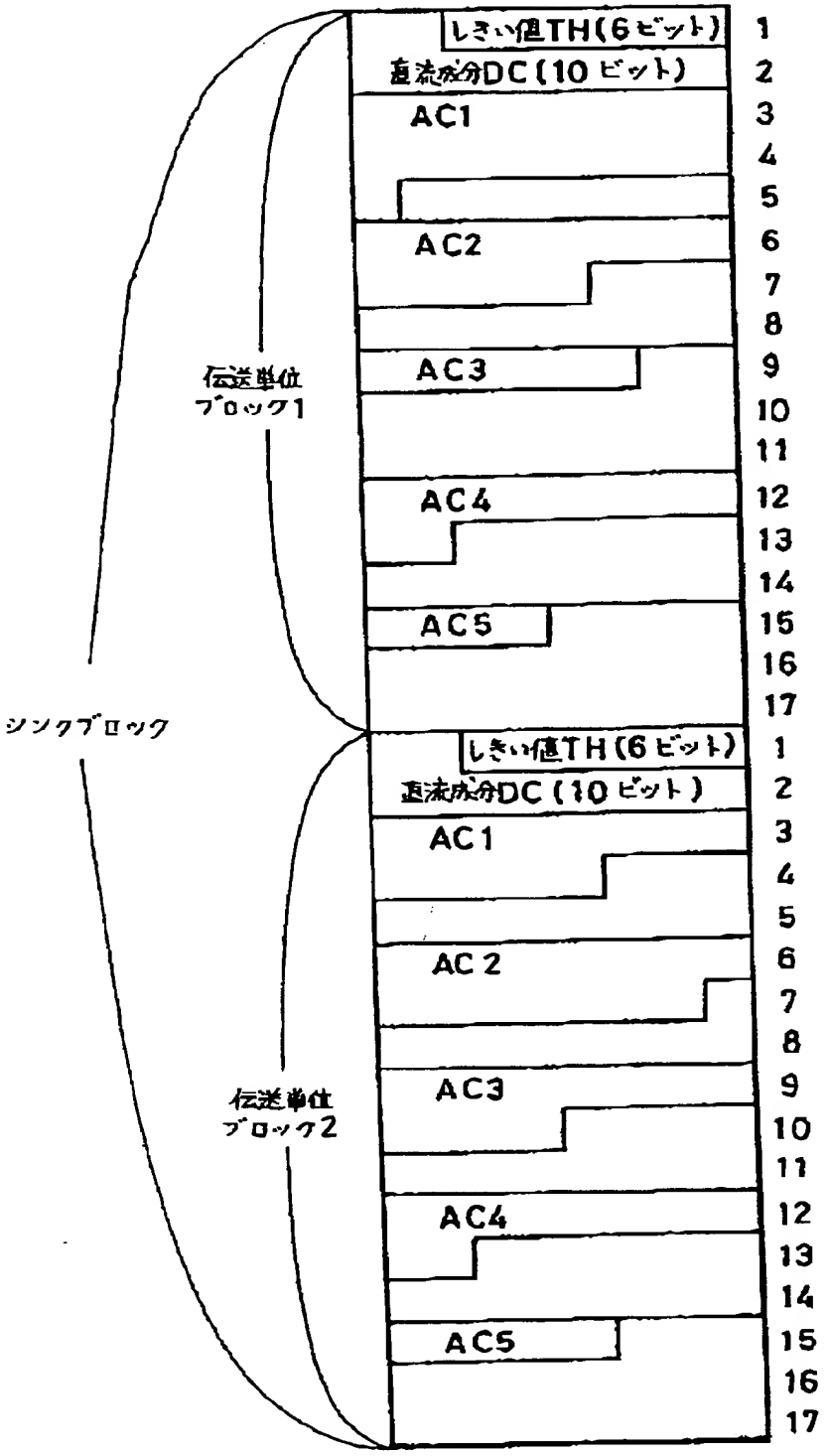

[Drawing 4]


A/D
ブロック化
シャフリング
11
12
13
14
20
DCT変換
ブロック走査
再量子化
21
22
23
バッファコントロール
27
フレーム化
バッファメモリ
可変長符号化
28
26
25
パリティ発生
ディジタル変調
P→S
15
16
17

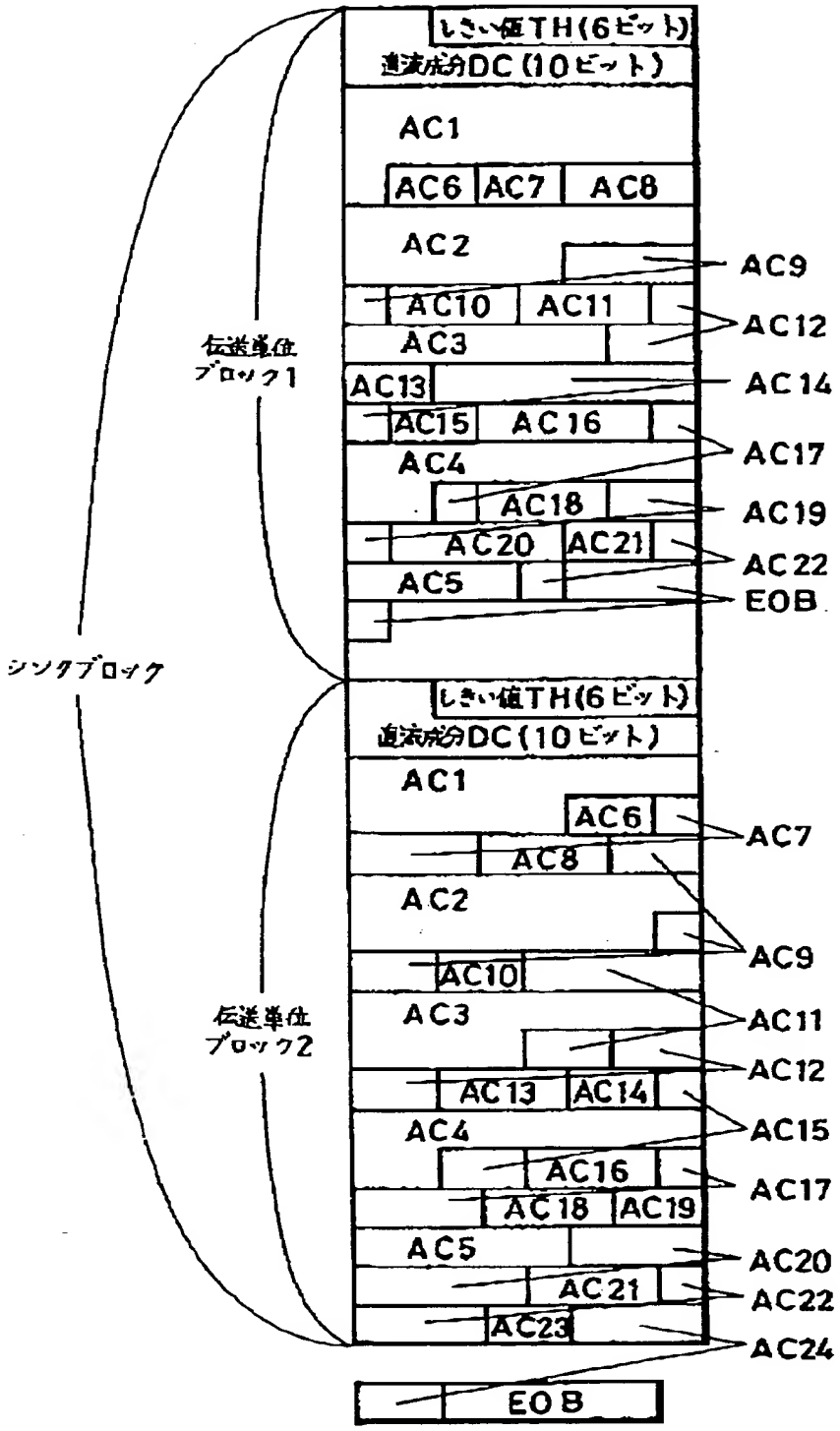
[Drawing 3]


しきい値
DC
AC
伝送単位ブロックＢＬ
しきい値
DC
AC
伝送単位ブロックＢＬ
シンクブロックＳＢ
しきい値
DC

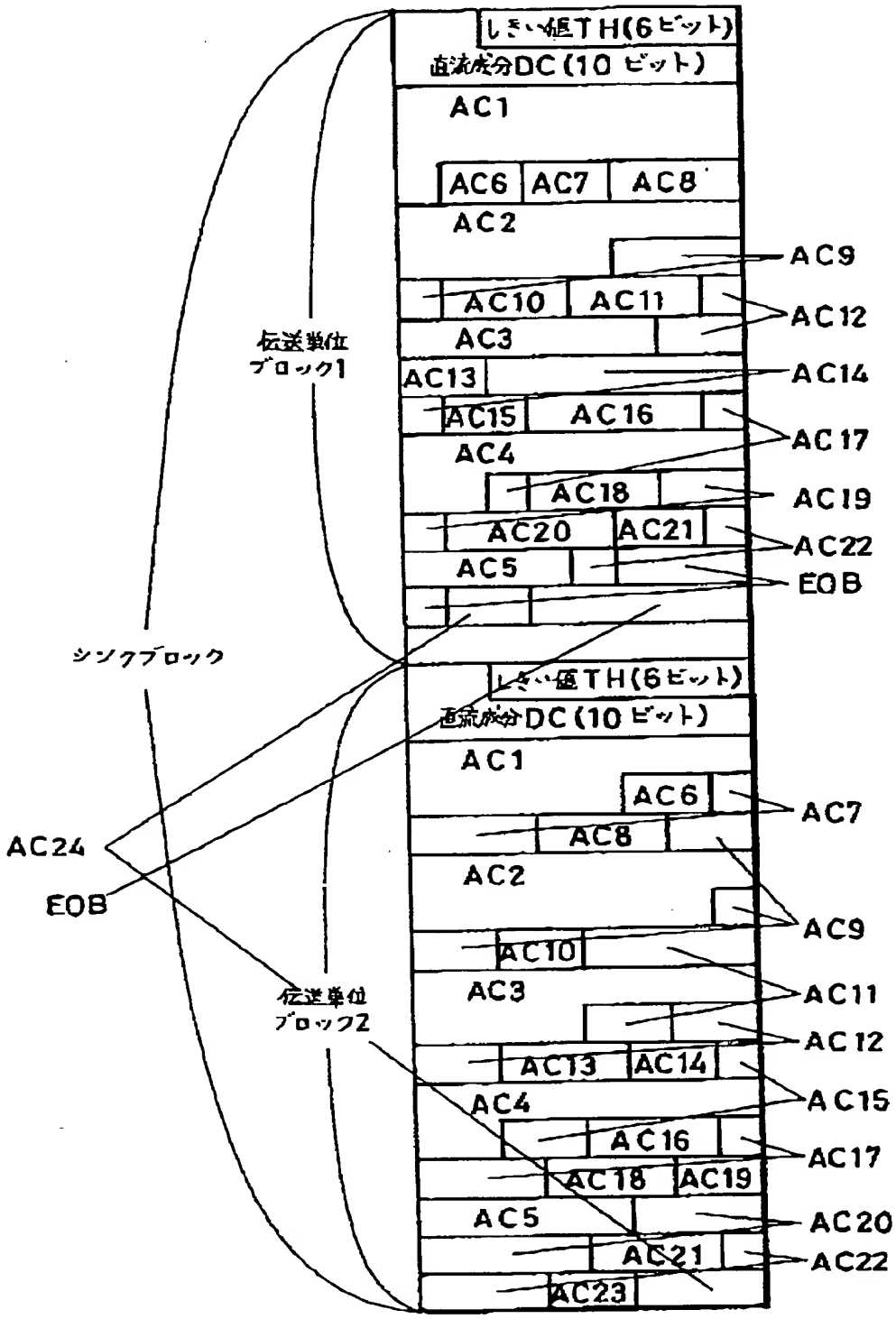
[Drawing 5]


しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC2
AC3
AC4
AC5
伝送単位
ブロック1
シンクブロック
しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC2
AC3
AC4
AC5
伝送単位
ブロック2
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17

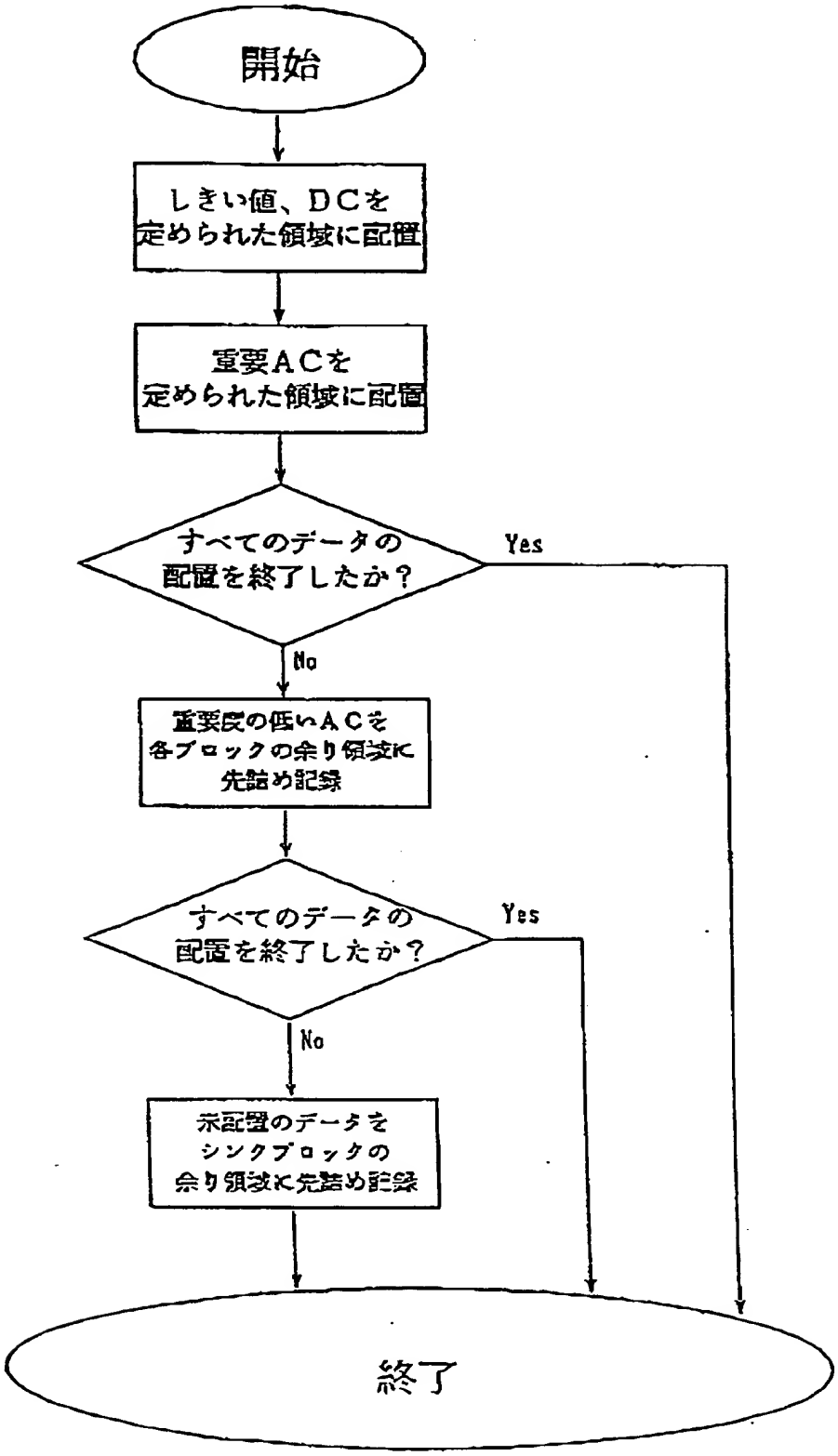
[Drawing 6]


しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC6
AC7
AC8
AC2
AC9
AC10
AC11
AC12
AC3
AC13
AC14
AC15
AC16
AC17
AC4
AC18
AC19
AC20
AC21
AC22
AC5
EOB
伝送単位ブロック1
シンクブロック
しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC6
AC7
AC8
AC2
AC9
AC10
AC11
AC3
AC12
AC13
AC14
AC15
AC4
AC16
AC17
AC18
AC19
AC20
AC5
AC21
AC22
AC23
AC24
EOB
伝送単位ブロック2

[Drawing 7]


しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC6
AC7
AC8
AC2
AC9
AC10
AC11
AC12
AC3
AC13
AC14
AC15
AC16
AC17
AC4
AC18
AC19
AC20
AC21
AC22
AC5
EOB
伝送単位ブロック1
シンクブロック
しきい値TH(6ビット)
直流成分DC(10ビット)
AC1
AC6
AC7
AC8
AC2
AC9
AC10
AC11
AC3
AC12
AC13
AC14
AC15
AC4
AC16
AC17
AC18
AC19
AC20
AC5
AC21
AC22
AC23
AC24
EOB
伝送単位ブロック2

[Drawing 8]

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[Translation done.]